



Projected future temperature and precipitation extremes in Chicago

Author(s): Vavrus S, Van Dorn J
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Abstract:

Weather extremes have profound societal impacts, and their characteristics are expected to change in the future due to greenhouse forcing. In Chicago, heat waves and cold waves cause more than 100 fatalities per year, while extremely heavy rainfall can trigger disease outbreaks via contaminant discharge of storm water and sewage overflows. Here we analyze statistically downscaled climate model projections of extreme heat, cold, and precipitation in Chicago, based on higher (SRES A1FI) and lower (SRES B1) greenhouse gas emissions scenarios. The frequency, duration, and intensity of heat waves in Chicago are likely to increase substantially, and the heat-wave "season" extended (time during the year when extreme heat occurs). The simulated frequency of hot days-daily maximum temperature (Tmax) >32 °C-increases from 15 days/year in the late 20th century to 36 days (B1) to 72 days (A1FI) by the end of this century. Proportionally, a much larger increase (a factor of 4 to 15) is projected in very hot days (Tmax>38 °C). Conversely, the frequency and intensity of extreme cold is likely to decline considerably during this century. The coldest night of the year is projected to warm by 4-8 °C, while the simulated occurrence of very cold conditions (daily minimum temperature<-18 °C) declines by ~50% (5 days, B1) to nearly 90% (8 days, A1F1) relative to the late 20th century. Simulated extreme precipitation events generally increase, especially during winter and spring, consistent with the seasonal changes in total precipitation. The projected seasonal changes in atmospheric circulation generally resemble the synoptic weather patterns associated with current extreme events, particularly during spring and summer, suggesting that some of the modeled response of extremes may be driven by mean dynamical changes. © 2009 Elsevier B.V.

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Resource Description

Climate Scenario : ☒

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES), Other Climate Scenario

Special Report on Emissions Scenarios (SRES) Scenario: SRES B1

Other Climate Scenario: SRES A1F1

Early Warning System: ☒

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

Climate Change and Human Health Literature Portal

A focus of content

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Precipitation, Temperature, Unspecified Exposure

Temperature: Extreme Cold, Extreme Heat

Geographic Feature:

resource focuses on specific type of geography

Urban

Geographic Location:

resource focuses on specific location

United States

Health Impact:

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation, Mitigation

Model/Methodology:

type of model used or methodology development is a focus of resource

Exposure Change Prediction

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Long-Term (>50 years)

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content